

1 CLAIMS

I claim:

1. In combination;

a fluid handling device having a fluid flow area;

5 a plurality of filter frames operatively removably mounted to said fluid handling device;

each of said filter frames having at least one outer frame member that defines a filter
area;

each of said filter frames having a filter selectively removably secured to said at least

10 one outer frame member so that said filter extends over said filter area;

at least one of said filters being a pocket filter.

2. The combination of claim 1 wherein at least one of said filters is a planar
filter.

3. The combination of claim 1 wherein said pocket filter has at least one
15 pocket portion.

4. The combination of claim 1 wherein at least one of said filters is a
multiple pocket filter.

5. The combination of claim 4 wherein said multiple pocket filter has
20 multiple pocket portions; said filter frame having at least one inner frame member
which defines multiple spaces for said pocket portions.

6. The combination of claim 1 wherein each of said filter frames comprises
multiple outer frame members; each of said filter frames comprising a horizontally
25 disposed upper frame member having first and second ends; a horizontally disposed

1 lower frame member having first and second ends, a first side frame member
extending between said first ends of said upper and lower frame members and a
second side frame member extending between said second ends of said upper and
lower frame members.

5 7. The combination of claim 6 wherein at least one of said filters is a planar
filter.

8. The combination of claim 6 wherein said pocket filter has at least one
pocket portion.

10 9. The combination of claim 8 wherein at least one of said filters is a
multiple pocket filter; said at least one multiple pocket filter having multiple pocket
portions; said multiple inner frame members defining a plurality of spaces for said
multiple pocket portions.

15 10. The combination of claim 1 wherein said pocket filter has a base panel
and a pocket portion; said base panel having first and second end portions separated
by a pocket opening; said pocket portion having a closed end and side panels defining
said pocket opening.

20 11. The combination of claim 10 wherein said pocket filter is selectively
movable between a collapsed position and a filter position.

12. The combination of claim 11 wherein said first and second end portions
of said base panel are adjacent one another and said side panels of said pocket
portion are adjacent one another when said pocket filter is in said collapsed position.

1 13. The combination of claim 11 wherein said side panels of said pocket
portion are spaced from one another to form a chamber when said pocket filter is in
said filter position.

5 14. The combination of claim 13 wherein less than the entire chamber is
exposed to straight line fluid flow.

10 15. The combination of claim 4 wherein said multiple pocket filter has a base
panel and multiple pocket portions; said base panel having multiple pocket openings
therein; each of said multiple pocket portions having a closed end and side panels that
define one of said pocket openings.

15 16. The combination of claim 15 wherein said multiple pocket filter is
selectively movable between a collapsed position and a filter position.

20 17. The combination of claim 16 wherein each of said first and second side
panels of said multiple pocket portions are adjacent one another when said multiple
pocket filter is in said collapsed position.

25 18. The combination of claim 17 wherein said first and second side panels of
each of said pocket portions are spaced from one another to form a chamber when
said multiple pocket filter is in said filter position.

30 19. The combination of claim 18 wherein less than the entire chamber is
exposed to straight line fluid flow.

35 20. In combination;
a fluid handling device having a fluid flow area;
a filter frame operatively removably mounted to said fluid handling device;

1 said filter frame having at least one outer frame member that defines a filter area;
said filter frame having a filter selectively removably secured to said at least one outer
frame member so that said filter extends over said filter area;
said filter being a pocket filter with at least one pocket portion and a base portion;
5 said base portion having at least one pocket opening formed therein;
said at least one pocket portion having a closed end and opposite side panels that
define said pocket opening.

21. The combination of claim 20 wherein said pocket filter is selectively
10 movable between a collapsed position and a filter position.

22. The combination of claim 21 wherein said opposite side panels of said at
least one pocket portion are adjacent one another when said pocket filter is in said
collapsed position.

23. The combination of claim 22 wherein said opposite side panels of said at
15 least one pocket portion are spaced from one another to form a chamber when said
pocket filter is in said filter position.

24. The combination of claim 23 wherein less than the entire chamber is
exposed to straight line fluid flow.

25. The combination of claim 20 wherein said filter frame has at least one
20 inner frame member that defines at least one space for said at least one pocket
portion.

26. A collapsible pocket filter for a fluid handling device, comprising:
25 a base panel and pocket portion;

1 said base panel having first and second end portions defined by a pocket opening;
said pocket portion having a closed end and opposite side panels that define said
pocket opening;
said pocket filter being selectively movable between a collapsed and a filter position,
5 said first and second end portions of said base panel being adjacent one another and
said side panels of said pocket portion being adjacent one another when said
pocket filter is in said collapsed position;
said side panels of said pocket portion being spaced from one another to form a
10 chamber when said pocket filter is in said filter position.

27. The pocket filter of claim 26 wherein said base panel and said pocket
portion are formed from a single piece of filtration media.

28. The pocket filter of claim 27 wherein said single piece of filtration media
15 is generally I-shaped.

29. The combination of claim 26 wherein less than the entire chamber is
exposed to straight line fluid flow.

30. A collapsible filter for a fluid handling device comprising:
a base panel and multiple pocket portions;
20 said base panel having multiple pocket portions having a closed end and opposite side
panels which define said pocket portions;
said filter being selectively movable between a collapsed and a filter position;
each of said first and second side panels being adjacent one another when said filter
25 is in said collapsed position;

1 each of said first and second side panels being spaced from one another to form a
chamber when said filter is in said filter position.

31. The combination of claim 30 wherein less than the entire chamber is
exposed to straight line fluid flow.

5 32. A method of using the device according to claim 2, comprising:
providing a fluid flow area that requires filtering of a particulate wherein said
concentration of said particulate varies from high to low over said fluid flow
area;

10 positioning said at least one planar filter where said concentration of said particulate is
low;

positioning said at least one pocket filter where said concentration of said particulate is
high.

15 33. The method of claim 32 further comprising monitoring said planar and
pocket filter to determine when each filter needs to be replaced.

34. The method of claim 33 further comprised arranging said planar and
pocket filters so that each filter needs replacement at generally the same time.

20 35. The method of claim 32 further comprised arranging said planar and
pocket filters so that each filter needs replacement at generally the same time.

36. In combination:
a filter frame having an upper frame member, a lower frame member, and first and
second side frame members;

1 a filter having an upper section, a lower section, and first and second side sections,
and a pocket body portion extending therefrom in the direction of air flow;
said upper, lower sections and said first and second side section of said filter being
selectively removably secured to said upper, lower, first and second frame
5 members, respectively.

37. The combination of claim 36 wherein said filter includes at least two
pocket body portions.

38. The combination of claim 37 wherein each of said frame members
10 comprises:

an elongated channel member including a first wall member having first and second
ends; a second wall member having first and second ends, said first end of said
second wall member being positioned adjacent said second end of said first
wall member, said second wall member extending at an angle from said first
15 wall member; a third wall member having first and second ends, said first end of
said third wall member being positioned adjacent said second end of said
second wall member, said third wall member extending at an angle from said
second wall member so as to be generally parallel to said first wall member; a
20 fourth wall member having first and second ends, said first end of said fourth
wall member being positioned adjacent said second end of said third wall
member, said fourth wall member extending at an angle from said third wall
member towards said first wall member; said second end of said fourth wall
member engaging said flexible filtration media and being spaced from said first
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1 wall member to provide an opening therebetween into which the filtration media
may be inserted and at least partially selectively maintained;
said first wall member having a plurality of spaced-apart filtration media engagement
points formed therein in said first end thereof for at least partially selectively
5 maintaining said flexible filtration media.

39. The combination of claim 3 wherein said filter frame associated with said
pocket filter has at least one inner frame member which defines a space for said
pocket portion.

10 40. The combination of claim 1 wherein each of said filter frames comprises
multiple outer frame members; each of said filter frames having at least one inner
frame member extending between said outer frame members.

41. The combination of claim 8 wherein said filter frame of said pocket filter
has at least one inner frame member which defines a space for said pocket portion.

15 42. A method of using the device according to claim 2, comprising:
providing a fluid flow area having consistent particulate concentration throughout that
requires filtering of the particulate wherein it is desired to predetermine a filter
replacement schedule falling between the minimum replacement schedule
20 established by planar filters and the maximum replacement schedule as
established by pocket filters;
increasing the number of planar filters relative to pocket filters to lessen the amount of
captured particulate that necessitates filter replacement;

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1 increasing the number of pocket filters relative to planar filters to increase the amount
of captured particulate that necessitates filter replacement.

43. The method of claim 42 further comprising:

5 monitoring the overall filtered fluid flow area relative to the desired replacement
schedule;

increasing the number of pocket filters relative to the number of planar filters if the
actual replacement schedule is less than the desired replacement schedule;

10 increasing the number of planar filters relative to the number of pocket filters if the
actual replacement schedule is greater than the desired replacement schedule.

44. The method of claim 42 further comprising:

15 providing a fluid flow area that requires filtering of a particulate wherein it is desired to
predetermine a filter replacement schedule falling between the minimum
replacement schedule established by planar filters and the maximum
replacement schedule as established by multiple pocket pocket filters;

increasing the number of planar filters relative to multiple pocket pocket filters to
lessen the amount of captured particulate that necessitates filter replacement;

20 increasing the number of multiple pocket pocket filters relative to planar filters to
increase the amount of captured particulate that necessitates filter replacement;

25 exchanging multiple pocket pocket filters for pocket filters having fewer pockets to
fractionally change the replacement schedule by a lesser amount than the
change that would have occurred if the multiple pocket pocket filter had been
exchanged for a planar filter.

1 45. The method of using the device according to claim 2 wherein it is desired
to change the efficiency of filtration without affecting the pressure drop across the
device using low efficiency, low pressure drop planar filters when lower efficiency is
required and replacing the planar filters with a combination of high efficiency, high
5 pressure drop filters in planar, pocket or multiple pocket configurations, as required.

 46. The method according to claim 45 wherein the pressure drop across the
fluid handling device is monitored; increasing the number of high efficiency planar
filters to increase the pressure drop; increasing the number of high efficiency multiple
10 pocket filters to decrease the pressure drop; replacing multiple pocket filters with
single pocket filters to increase the pressure drop less than the increase that would be
obtained by replacing the multiple pocket filter with a planar filter.

 47. The method of using the device according to claim 2 comprising:
providing a fluid flow area requiring particulate filtration wherein it is desired to vary the
15 fluid flow rate in various zones in the fluid flow area;
providing planar filters in those zones requiring lesser flow rates;
providing multiple pocket filters in those zones requiring higher flow rates; and
providing single pocket pocket filters in those zones requiring a higher fluid flow rate
20 than is achieved by planar filters and a lower flow rate than is achieved by
multiple pocket filters.